

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R2PSME_{dy}

Great Basin Douglas-Fir - Dry

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

Modelers

Lynn Bennett lbennett@fs.fed.us
Louis Provencher (ed.) lprovencher@tnc.org

Reviewers

Hugh Safford hughsafford@fs.fed.us
Steve Barrett sbarrett@mtdig.net

Vegetation Type

Forested

Dominant Species*

PSME
PICO
POTR5

General Model Sources

- Literature
- Local Data
- Expert Estimate

LANDFIRE Mapping Zones

12 17
13 18
16

Rapid Assessment Model Zones

- California
- Great Basin
- Great Lakes
- Northeast
- Northern Plains
- N-Cent.Rockies
- Pacific Northwest
- South Central
- Southeast
- S. Appalachians
- Southwest

Geographic Range

PNVG found primarily in Idaho, northern Nevada, and Utah.

Biophysical Site Description

This type is generally located just above sagebrush ecosystems and adjacent to ponderosa pine woodlands. Elevation ranges from 4,000 to 8,700 feet. The xeric Douglas fir type is most strongly expressed on low- to mid-elevation southerly aspects and represents the transition between grasslands and continuous Douglas fir forest.

Vegetation Description

This PNVG was dominated by mostly mid- and late-open forest structure of Douglas-fir; however, some mid- and late-closed forest structure also occurred. Minor amounts of lodgepole pine may have been present in the mid- and late-closed forest structure. Closed forest structure was most likely to occur in areas where site features modified fire behavior to allow for increased tree stocking. Aspen may have been present in smaller patch sizes in mesic sites or riparian areas, mostly in the closed forest structure conditions.

Undergrowth was mostly fire-resistant grasses and forbs that resprouted after fires. This PNVG's fire regime allowed an open overstory of mature Douglas-fir to survive many fires. Small trees and associated less fire-resistant species were heavily thinned by moderate- intensity burning. Additionally, some nonlethal underburns occurred in lodgepole pine stands having light fuels. Occasional stand-replacing fires were also part of the mixture making up this fire regime.

Disturbance Description

This PNVG is in a Fire Regime Group I. Some portions of these sites are transition zones to Fire Regime Groups II and III. Frequent surface and mixed severity fires were the common fire regime characteristics.

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Surface fires intervals ranged from 10 to 50 years, and replacement severity occurred at intervals of 150 to 400+ years (Crane 1986; Barrett 1988; Bradley et al. 1992a, 1992b; Brown et al. 1994; Morgan et al. 1996). Mixed severity fires were assumed to have an intermediate FRI of 45 to 75 years on average. Stand replacement fires were generally restricted to the closed canopy forest and the stand initiation conditions.

The Fire Regime Group I characteristics were facilitated by understory vegetation dominated by fine fuels (grasses, sedges, forbs), landscape position, and adjacency to other frequent fire PNVG's. Much of the forest structure was open canopy overstory that resulted in an understory dominated by healthy and vigorous plants (grasses, sedges, and forbs) and generally continuous fine fuels layer. These fine fuels facilitated fire spread and thinning of the conifer or aspen seedlings (thus promoting aspen suckering).

In this PNVG, aspen patches occurred at smaller scale than the Douglas fir forest. The aspen tended to be located in the more mesic sites. These more mesic sites would have had grass understories that did not cure as early in the year as surrounding areas, especially under a closed forest canopy, and these mesic areas often experience quicker humidity recovery in the evenings. These circumstances tended to lessen the fire severity in the aspen stands which acted as fire-safe sites compared to the surrounding landscape. This was important because aspen is much less resistant to fire than Douglas fir. Greater suckering would occur at the edges of aspen patches.

Other disturbances included insect (return interval of 100 yrs), disease, drought, and wind and ice damage (every 1,000 yrs in closed stands; every 250 yrs in open stands). Competition among trees was also a factor that increasingly slowed successional dynamics in more closed stands. Fire was by far the dominant disturbance agent.

Adjacency or Identification Concerns

PNVG is often transitional between non-forested areas or between *Pinus ponderosa* (at lower elevations) and *Abies* spp. At higher elevations. Sites are dry montane with a variety of slopes, aspects, and soil conditions.

In the Idaho portion of the Great Basin the major habitat types include: PSME/SPBE-SPBE, PSME/CAGE-SYOR, PSME/CAGE-CAGE, PSME/CARU-CARU, PSME/CARU-FEID, PSME, PSME/ACGL-SYOR, PSME/PHMA-PSME, PSME/SPBE-CARU, PSME/SYAL-SYAL, PSME/BERE-SYOR, PSME/ARCO-ARCO, PSME/JUCO, PSME/VACA-CARU, PSME/VAGL, PSME/CARU-CARU (Steele et al. 1981).

This PNVG includes small areas of ABLA habitat types that are transitional between FRG I, III, and IV. This is especially true for the ABLA sites with HRV fine fuel understory vegetation conditions such as pine grass or elk sedge.

This PNVG may be similar to the PNVG R0PSME_{dy} from the Northern and Central Rockies model zone.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

This PNVG occurs in patches ranging from 1000's to 10'000's of acres.

Issues/Problems

1) Competition/maintenance among trees was used as a disturbance in all classes but A. This disturbance, however, is only theoretical because the ecological setback was zero in all classes. In fact, the disturbance is non-existent in the model, which does not seem appropriate. 2) Stand replacement is used in class A with a FRI of surface fire. Although this appears ecologically correct, it greatly lowers the MFI for stand replacement, which is much longer in other classes. One expert suggested that the total fire probability in class A was 0.05/year with 80%/20%, respectively, for stand replacement and mixed severity fires. Those values were used. 3) The model is most sensitive to the FRI of stand replacement in class A and D, and the

return interval of wind/weather/stress in class D (stand replacing event). These transitions are responsible for the large percentage of class A in this xeric PNVG.

Model Evolution and Comments

This PNVG includes much of the dry Douglas-fire ecosystems. This model was based on the original FRCC model DFIR!. For the Rapid Assessment, this model was originally coded as R2PSMEpw and was changed to R2PSMEDy on 12/13/2004.

Both expert suggested a need to distinguish this PNVG from the mesic Douglas fir (R2PSMEms) one. The shorter FRIs, especially in class A, were added to this PNVG to reflect that need.

Succession Classes															
<i>Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).</i>															
<p>Class A 20 %</p> <p>Early1 PostRep</p> <p>Description</p> <p>Grass/forb/shrub/tree seedlings. Replacement fire is frequent (FRI of 25 yrs) and causes an ecological setback of 35 yrs. Mixed severity fire (FRI of 100 yrs) does not cause an ecological setback. Vegetation will succeed to the mid-development closed (class B) condition in 35 yrs.</p>	<p>Indicator Species* and Canopy Position</p> <p>CARU CAGA3 PSEUD7</p> <p>Upper Layer Lifeform</p> <p><input type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree</p> <p>Fuel Model no data</p>	<p>Structure Data (for upper layer lifeform)</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>1 %</td> <td>15 %</td> </tr> <tr> <td>Height</td> <td>no data</td> <td>no data</td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2">no data</td> </tr> </tbody> </table> <p><input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:</p>		Min	Max	Cover	1 %	15 %	Height	no data	no data	Tree Size Class	no data		
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Tree Size Class	no data														
<p>Class B 5 %</p> <p>Mid1 Closed</p> <p>Description</p> <p>Forest canopy closure is >35%. Closed stand with trees, poles, saplings, grass, and scattered shrub, 75 to 100% Douglas fir. In the absence of fire, vegetation will succeed to E (closed, late-development) after 70 years. Replacement fire (average FRI of 150 yrs) and infrequent weather-related stress (return interval of 250 yrs) returns vegetation to class A. Mixed severity fire (FRI of 45 yrs) and insect/diseases every 100 yrs on average will cause a transition to an open mid-development forest (class C). Competition (probability/year = 0.01) maintains the stand in its</p>	<p>Indicator Species* and Canopy Position</p> <p>PSEUD7 PICO POTR5</p> <p>Upper Layer Lifeform</p> <p><input type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree</p> <p>Fuel Model no data</p>	<p>Structure Data (for upper layer lifeform)</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>35 %</td> <td>99 %</td> </tr> <tr> <td>Height</td> <td>no data</td> <td>no data</td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2">no data</td> </tr> </tbody> </table> <p><input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:</p>		Min	Max	Cover	35 %	99 %	Height	no data	no data	Tree Size Class	no data		
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closed condition.

Class C 10%

Mid1 Open

Description

Forest canopy closure is 16% to 35%. Open trees, poles, saplings, and grass scattered shrubs, 100% Douglas fir. With surface fire (FRI of 10 yrs), mixed severity fire (FRI of 75 yrs), weak adult tree competition, and insect/diseases (every 100 years), primary succession is to D, the open late-development condition. Infrequent stand-replacing fire (FRI of 400 yrs) and infrequent weather-related stress (return interval of 1,000 yrs) will cause transitions to A. The stand will succeed on an alternative path to a closed late-development condition after 70 yrs without fire.

Indicator Species* and Canopy Position

PSEUD7

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	35 %
Height	no data	no data
Tree Size Class	no data	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class D 60%

Late1 Open

Description

Forest canopy closure is 16% to 35%. Open large tree/ grass and scattered shrubs; 100% Douglas fir. Surface fire (FRI of 10 yrs) and mixed severity fire (FRI of 75 yrs) maintain the stand in the open condition (i.e., succession from D to D). This open condition, however, will close after 70 years without fire (alternative path to E). Adult tree competition (probability/yr of 0.001) and insect/diseases (100 yrs return interval) also disturb this class, but do not affect the successional age. Replacement fire every 500 yrs on average and weather-related stress (1,000 yrs return interval) will cause a transition to A.

Indicator Species* and Canopy Position

PSEUD7

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	35 %
Height	no data	no data
Tree Size Class	no data	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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Class E 5%

Late1 Closed

Description

Forest canopy closure is >35%. Closed large trees, pole-sapling trees, scattered shrubs, 80 to 100% Douglas fir. Replacement fire (FRI of 150 yrs) and infrequent weather/wind-related stress (return interval of 250 yrs) cause a transition to class A. Mixed severity fire (FRI of 45 yrs) and insect/diseases (return interval of 100 yrs) open the structure of the stand (transition to D), whereas surface fire (FRI of 50 yrs) and competition, although present, do not cause transitions to other classes. Succession is from E to E in the closed condition.

Indicator Species* and Canopy Position

PSEUD7
PICO
POTR5

Structure Data (for upper layer lifeform)

	Min	Max
Cover	36 %	99 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Fuel Model no data

Disturbances

Non-Fire Disturbances Modeled

- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other:

Fire Regime Group: 1

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

Historical Fire Size (acres)

Avg:
Min:
Max:

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	90			0.01111	12
Mixed	76			0.01316	14
Surface	14	10	50	0.07143	75
All Fires	10			0.0957	

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